

Influential Factors of Medication Adherence in the HIV-Positive African-American Female
Population

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Abstract

Medication adherence of antiretroviral therapy (ART) is a critical factor of the quality of life in people living with HIV/AIDS. Near perfect levels of medication adherence is needed to optimally suppress viral load, though they are not frequently achieved. African American women constitute as the biggest group of women living with HIV/AIDS. Currently, the relationship between medication adherence and African American HIV-positive women is not clearly understood, but is vital to the livelihood of this population. We performed a systematic review in order to understand what factors influence medication adherence in African American HIV-positive women. We examined peer-reviewed studies published between 2006 and 2016 using a variety of databases. An initial search yielded 808 studies, of which 14 studies met our inclusion criteria. Conspiracy beliefs, medical mistrust, social support, stigma, and depression appear to impact medication adherence in this population. Healthcare providers must foster trusting relationships with their patients, be able to identify barriers of emotional support, and address mental health in their treatment plans.

Introduction

Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) continues to be a persistent public health issue on national and global levels. The World Health Organization (WHO) estimates that almost 78 million people have been infected with the HIV virus and 39 million people have died due to HIV infection (n.d.). As of 2015, there are about 37 million people living with HIV/AIDS (PLWH) worldwide (Centers for Disease Control [CDC], 2015a). The CDC further estimates 50,000 new cases of HIV/AIDS arise every year (2015a). Lastly, it is estimated that 658,507 people diagnosed with HIV/AIDS in the U.S. have died, even though HIV/AIDS treatment regimens are now more readily available (CDC, 2015a & Arts & Hazunda, 2012). These statistics demonstrate that the population of HIV-positive people

continues to grow and, despite developments in HIV/AIDS treatment regimens that can greatly improve HIV-infected people's livelihood, the infection is still a sustained problem today.

The diagnosis of HIV/AIDS has evolved from being perceived as a death sentence to a manageable disease. The National Institute of Allergy and Infectious Diseases (NIAID) defines HIV, or human immunodeficiency virus, as the virus that targets the body's immune system by weakening T cells that fight off infections, which leads to the infected individual being more vulnerable to infections and other complications (2012). HIV can progress to AIDS, or acquired immunodeficiency virus, which is the final stage of HIV infection that is achieved when the infected individual has one or more infections subsequent to the immunocompromised state and a T cell count of less than 200 cells per millimeter of blood (NIAID, 2012). HIV/AIDS is transmitted through contact with bodily fluids such as blood, semen, vaginal, rectal discharge, and breast milk of a person with HIV and is therefore commonly transmitted through sexual contact, needle and syringe sharing, and pregnancy (CDC, 2015a). In the United States, more than 1.2 million people are living with HIV/AIDS (HHS, 2014). Men who have sex with men (MSM) of all races and ethnicities are the most affected group by HIV, accounting for 54% of all PLWH in 2011 (HHS, 2014). In 2010, white MSM made up the largest percentage of new HIV infections (HHS, 2014). Women accounted for 20% of new HIV infections in 2010 and 23% of those living with HIV in 2011 (CDC, 2015b). Hispanics and Latinos accounted for 20% of PLWH in 2011, while African Americans accounted for 41% (CDC, 2015b). Furthermore, African American women account for about 29% of new HIV/AIDS infections every year and represent an infection rate 20 times higher than Caucasian women and 5 times higher than Hispanic women (CDC, 2015c).

Treatment

Advancements over recent decades have been made concerning HIV/AIDS treatment. Antiretroviral therapy (ART) has dramatically improved health trajectories for people affected by HIV/AIDS by reducing viral load and risk of transmission (Spivak & Planelles, 2015). Today, pharmacological intervention for HIV-positive individuals usually involves health care providers implementing an approach called highly active antiretroviral therapy (HAART), which combines drugs from at least 2 of the 6 available drug classes of ART in order to avoid creating viral strains that are resistant to single drugs (NIAID, 2013 & Mayo Clinic, 2015). The typical treatment regimen for PLWH is long term and can cause significant lifestyle changes because adherence to treatment critically influences the quality of life of PLWH.

Adherence

There are many contributing factors to one's physical, emotional, and mental experience of HIV/AIDS. HIV/AIDS-infected people are expected to maintain a high degree of medication adherence in order to reduce serum viral load and maintain adequate immune status (Mayo Clinic, 2015). The Food and Drug Administration (FDA) defines medication adherence as the degree to which patients take medication as prescribed by their doctors by filling prescriptions regularly, taking the medication on time in the way it is meant to be taken, and understanding the directions concerning the medication given by one's doctor (2015). PLWH are largely dependent on antiviral medications to manage their illness, as antiretroviral therapy (ART) have dramatically improved health trajectories by reducing HIV-related morbidity, mortality, and the likelihood of transmitting of the infection to a sexual partner while improving the manageability of daily living with HIV/AIDS (National Institute of Health, 2016). However, in order for people affected by HIV/AIDS to receive the maximum benefits from ART, they must maintain at least a 95% adherence level to their medications (Peltzer & Pengpid, 2013). Moderate to low levels of

adherence leads to increased viral replication and low drug serum levels, which can result in viral mutations and therefore drug resistant strains of HIV. Resistant strains of the virus reduce the effect of ART on disease management and treatment. Furthermore, ineffective medication compliance leads to the increased risk of jeopardizing the effectiveness of future treatment regimens due to the drug resistant strains (Ribeiro, Sarmiento e Castro, Dinis-Ribeiro, & Fernandes, 2015). Therefore, medication adherence is not only an individualized complication for each person affected by HIV/AIDS, but also a public health problem for the current and future HIV/AIDS populations.

One's ability to maintain optimal medication adherence is multifactorial and therefore can be difficult for health care providers to gauge. The FDA has identified that hard to remember medication schedules, unpleasant side effects, the possible lack of physical reminder of their illness, and unfamiliarity of the risk of drug resistance that can occur with skipped doses and irregular adherence are some of the main reasons PLWH are not adequately compliant with their medication regimen (2015). Various traits of an HIV-positive person also contribute to his or her ability to appropriately adhere with his or her medication regimen. One's financial status, cognitive function, psychological state, and sociodemographic traits have all been identified as sources of influences in an individual's life that contribute to his or her ability to maintain effective medication adherence (Katz, Ryu, Onuegbu, Psaros, Weiser, Bangsberg, & Tsai, 2013). Of these attributes, psychological and mental traits have been some of the most difficult to address by health care providers because these traits are typically addressed within an individual's treatment regimen as symptoms of the illness, rather than social processes commonly experienced by HIV/AIDS-affected patients (Arnold, Rebchook, & Kegeles, 2014). Medication adherence can also be compromised due to the social stigma associated with HIV/AIDS, as many HIV-positive people feel ashamed and embarrassed of their disease status

because of the negative connotations that are associated with HIV/AIDS, such as reckless sexual behaviors and drug use (Szu-Szu & Holloway, 2015).

Current research reveals that women have been shown to maintain lower adherence rates than men (Turner, Laine, Cosler, & Hauck, 2003) and African American females are more likely to encounter setbacks such as low income and lack of health insurance, which can negatively affect their medication adherence rates (Bozzette et al., 1998). There is limited research available that explores adherence in specifically African American females, rather than African Americans as a whole or African American men that have sex with men. It is evident that African American women make up a prominent group within the HIV/AIDS population and require research specific to them in order to address barriers and disadvantages they may face that prevent the achievement of optimal health outcomes, though a better understanding as to why low levels of adherence is prevalent in this population must be assessed first. Therefore, the purpose of this systematic review is to examine influential factors of medication adherence in the HIV-positive African American female population.

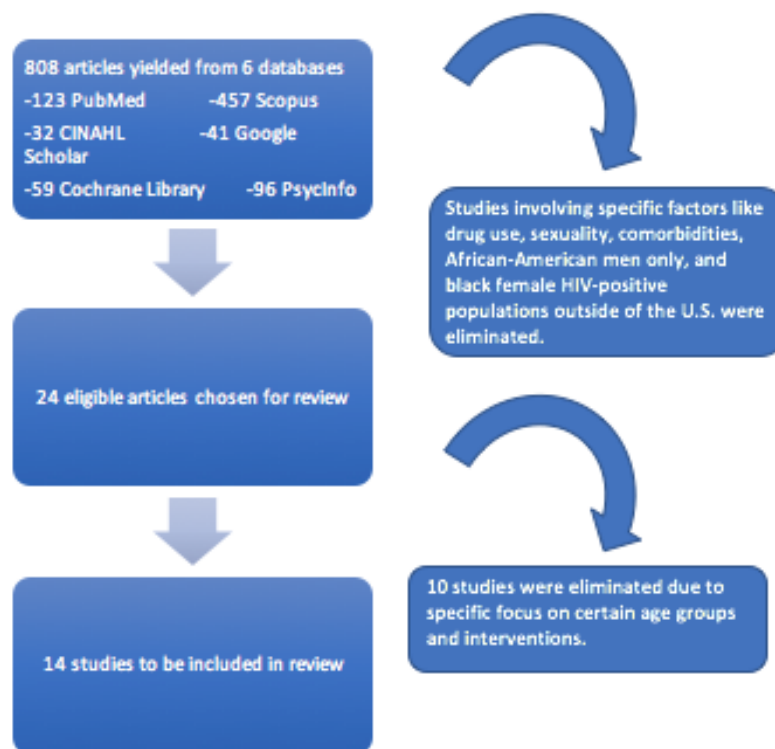
Methods: Criteria, Search Strategy, and Data Sources

The search criteria for the review were articles in English, peer-reviewed, and published within the past 10 years. Six data bases were searched for relevant literature: PubMed, CINAHL, Cochrane, Scopus, Google Scholar, and PsycInfo. The search terms used were “HIV”, “AIDS”, “medication adherence”, compliance, and “African-American”. Including keywords specifying gender, such as “women” or “female”, significantly reduced the body of literature available to screen and were therefore omitted from the search. Using these terms, the search yielded 123 articles from PubMed, 32 articles from CINAHL, 59 articles from Cochrane, 457 articles from Scopus, 41 articles from Google Scholar, and 96 articles from PsycInfo.

Study Selection

A total of 808 articles were yielded by the initial search through the six data bases. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), an initial examination was conducted to remove duplicate articles and screen for relevance in the articles' titles. Studies with emphasis on subjects like drug use, sexuality, and comorbidities or focused on only African-American men or black female HIV-positive populations outside of the United States were eliminated, as these topics are irrelevant to this review. Through this process, 24 articles that met the search criteria were chose for further evaluation. A subsequent examination of the studies' abstracts was conducted, resulting in the elimination of 10 studies, and yielded 14 studies to be included in the review.

Figure 1 Flow chart of study selection process



Data Extraction

Table 1 depicts each study according to: author and year of publication, purpose, research design, methods, sample size, and findings.

Results

Based on the studies included in this review, five reoccurring themes that related to medication adherence in HIV-positive African American women were identified, including conspiracy beliefs, medical mistrust, social support, stigma, and depression. This paper will further explore how these factors influence medication adherence in HIV-positive African American women.

Conspiracy Beliefs

One of the reoccurring barriers to medication adherence in HIV-positive African American women was the support of conspiracy theories. Conspiracy theories in relation to HIV/AIDS claim that HIV is a manmade virus and a treatment for HIV/AIDS exists, but is being withheld from the poor by the government. Conspiracy theories perpetuate misinformation within the HIV community about the effectiveness of pharmacologic regimens, leading endorsers of these theories to be less likely to adhere to them. Bogart et al. found that believing in conspiracy theories was associated with low medication adherence patterns among the study's participants (2016). Furthermore, the study revealed that women and African American participants were more likely to believe in conspiracy theories, suggesting that medication adherence would be the most variable in these populations (Bogart et al., 2016).

Medical Mistrust

Another reoccurring barrier is medical mistrust, which researchers believe stems from the historical discrimination and unethical medical experimentation and exploitation of African Americans. Gaston and Alleyne-Green (2013) explain that African Americans fail to optimally

engage in healthcare because historical experiences of racism, discrimination, and unethical research practice has led to a general mistrust of the healthcare system, which can lead to the hindrance of building trusting relationships with healthcare providers and spread of misinformation among PLWH about treatment regimens. A 2009 study revealed that African Americans were more likely to discontinue ART because of changes in doctors and clinics, suggesting that the lack of continuity in healthcare services which hinders the development of trust between patients and their healthcare providers may not adequately support optimal medication adherence (Johnson et al., 2009). Furthermore, discrimination by healthcare providers also imposes difficulties with medication adherence. Peltzer, Domian, and Teel (2015) reveal in a study of young African American women living with HIV that discrimination by healthcare providers can be a humiliating experience and reduce one's self worth. These feelings can result in a decrease in motivation to adherence to medication regimens and contributes to the mistrust between healthcare provider and patient.

Social Support

Bogart et al. (2016) explains that the opinions of one's social network can have the most impact on one's health behaviors. Social support can affect medication adherence by acting as a buffer against barriers to adherence. In an assessment of social networks among HIV-positive African Americans utilizing ART, nonadherence to ART decreased as frequency of interactions amongst social network members increased (Bogart et al., 2015). Furthermore, social support provides encouragement for PLWH. Though HIV-positive African American women often find themselves within a care taker dichotomy, in which they care for their significant others, family, and children while neglecting their needs, social support can ease the burden of disease PLWH struggle with daily and fulfill the need women who function as caretakers have to care for themselves by facilitating medication adherence through transportation to doctor appointments,

picking up prescriptions, and reinforcing the prescribed medication regimen schedule (Edwards, 2006 & Peltzer, Domian, & Teel, 2015). Conversely, the lack of or turbulent support by social network members can isolate HIV-positive African American women, as their disease status labels them as abnormal in comparison to the members of their social network, or deteriorate coping abilities due to fluctuating feelings of security within social relationships (Edwards, 2006 & Peltzer, Domian, & Teel, 2015). By lacking the feeling of being loved and cared for, many HIV-positive African American women felt less motivated to adhere to medication regimens since they could not effectively cope with the stress of isolation (Edwards, 2006).

Stigma

Stigma can also negatively affect medication adherence in HIV-positive African American women because it compromises general psychological processes like adapting and coping (Katz et al., 2013). Adhering to a strict medication regimen is a physical identifier of one having a disease such as HIV/AIDS, and can lead to feelings of embarrassment and shame because of the perceived depiction of abnormality. According to multiple studies, these feelings have hindered medication adherence in African American women, in effort to suppress acknowledgement of living with a disease (Earnshaw, Bogart, Dovidio, & Williams, 2013, Edwards, 2006, & Katz et al., 2013). Additionally, fear of stigma often causes PLWH to avoid disclosing their disease status to their family and peers in order to avoid the discrediting or abnormal social label HIV/AIDS is associated with. Through cross sectional interview, Johnson et al. (2009) revealed that African Americans were more likely to discontinue ART to avoid disclosing disease status to others. Additionally, many HIV positive women blame perceived stigma for avoiding disclosure of disease status, which can impede coping skills that are necessary to achieve satisfactory quality of life (Ho & Holloway, 2015). By impeding the adapting and coping capabilities of HIV-positive African American women, stigma weakens the

perception of self-efficacy to properly adhere to medication regimens and may result in lapses in adherence (Sweeney & Venable, 2016).

Depression

Feelings of depression are common upon diagnosis of HIV, but can negatively impact the livelihood of PLWH if left unmanaged. Not only has depression been associated with decreased medication adherence, but it is also especially impactful on HIV-positive African American women, as they have been found to experience more psychological distress as a result of living with HIV in comparison to Caucasian women (Gaston & Alleyne-Green, 2013 & Ho & Holloway, 2015). Depression in African American women often goes untreated because of the stigma surrounding mental illness and the fear of adding another medication to their already existent medication regimen and being admitted inpatient for treatment (Peltzer, Domian, & Teel, 2015). By not pursuing adequate treatment for depression, African American women are more likely to become socially isolated and struggle with adaptive coping, which weakens the ability to optimally adhere to their medication regimens (Gaston & Alleyne-Green, 2013 & Katz et al., 2013).

Conclusion

Conspiracy theories, medical mistrust, social support, stigma, and depression are all influential factors of medication adherence in the HIV-positive African American female population. Though factors of adherence were identified, some limitations of this study include lack of diversity in stages of disease and ages of participants, potential bias from studies that included personal narratives of participants, the small sample of research included in the review, and the majority of studies collecting data at one point in time.

Given the identified barriers, changes in health care must be implemented in order to improve medication adherence patterns in African American women. A holistic health approach

when addressing the needs of HIV-positive patients should be incorporated in treatment plans to address not only their physical needs in terms of viral loads, but also psychological and mental health needs in terms of level of external support and coping skills against depressive symptoms. Additionally, healthcare providers must foster trusting relationships with their patients in order to support continuity of care and identify barriers of emotional support. Future research exploring the underlying mechanisms behind the increased psychological distress in African American women and medication adherence across the lifespan would also contribute to the understanding of medication adherence in HIV-positive African American women.

Table 1 Summary of findings

AUTHOR (YEAR)	PURPOSE	RESEARCH DESIGN	METHODS	SAMPLE SIZE	FINDINGS
Bogart et al. (2016)	To assess the relationship between communicated mistrust within social networks and treatment adherence among African Americans living with HIV	Quantitative study	Survey	N=246 Majority of participants were of low socio-economic status, low annual incomes, and unemployed	<ol style="list-style-type: none"> 1. Medical mistrust may stem from history of discrimination 2. social network members can promote healthy behaviors by communicating norms (i.e. condom use) 3. Individuals with poor health behaviors and medical mistrust are more likely to believe in conspiracy theories 4. When similar alters expressed conspiracy beliefs, participants exhibited lower treatment adherence 5. Opinions of social network members who are similar in terms of age, gender, sero-status, sexual orientation, and race/ethnicity may have particular impact on people living with HIV 6. On average, 64% of medications were taken as prescribed

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Bogart et al (2015)	To examine how characteristics of a social network affects stigma perception in African-Americans living with HIV	Quantitative study	Baseline assessment of social network and statistical analysis	N=147	<ol style="list-style-type: none"> 1. Stigma and non-adherence was decreased among participants who increased the frequency of their interactions with alters over time 2. Well-connected social networks have the potential to buffer the effects of stigma 3. Blaming by alters decreased adherence
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Charania et al. (2014).	To identify evidence-based interventions for increasing HIV medication adherence behavior or decreasing viral load among persons living with HIV	Qualitative study	Systematic review	N/A	1. Non-EBIs more often targeted specific populations (e.g., women, high-risk youth, MSM, and men).
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<p>Earnshaw, Bogart, Dovidio, and Williams. (2013).</p> <p>Stigma and racial/ethnic HIV disparities: Moving toward resilience. <i>The American Psychologist</i>. 68 (4).</p>	<p>To examine how mechanisms of stigma contribute to HIV-related disparities in risk, incidence and screening, treatment, and survival and what can be done to reduce the impact of stigma on these disparities</p>	<p>Qualitative study</p>	<p>Literature review and proposed agenda</p>	<p>N/A</p>	<ol style="list-style-type: none"> 1. Societal stigma contributes to racial and ethnic disparities in who acquires HIV, is aware of their sero-status, receives treatment, and dies early 2. people with conflicting identities may be more likely to lack social support
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Edwards (2006).	To explore the relationship between perceived social support and HIV medication adherence in African American women	Qualitative study	Collected data via journals and interviews	N=20 Participants ages 21-49	<ol style="list-style-type: none"> 1. A lack of true information about HIV feeds into stereotypes (i.e. drug user, promiscuous) about HIV by non-infected people 2. Social relationships served as a distract from the idea of living with disease, but at times perpetuated stigma 3. Taking meds is a physical and emotional identifier of having disease and causes embarrassment if the individual is amongst other people 4. Participants identified need to feel loved and cared for in order to love and care for self 5. Married participants jeopardized their own health and well-being to provide care and support for their husbands 6. HIV stigma in the forms of social labeling, discrediting assumptions, and changing self-identity can lead to self-hatred 7. Relationship turbulence compromised social support and posed as a barrier to adherence 8. Family decreases burden of disease by alleviating stress, providing distraction and encouragement, and facilitating normal environment 9. Children provided motivation to take medication
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Gaston and Alleyne-Green (2013)	To assess how attitudes about HIV in health care systems affect engagement of African Americans in care	Qualitative study	Systematic review	N/A	<p>1. African-Americans aren't optimally engaged in healthcare because of distrust of health care system secondary to racism, discrimination, and unethical research practice</p> <p>2. Healthcare providers must acknowledge historical relationship with health care system since health care suspicion can lead to misinformation of HIV and HIV treatment</p> <p>3. Women and African-Americans are more likely to believe in conspiracy theories</p>
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<p>Genberg, Lee, Rogers, and Wilson (2016).</p> <p>Four types of barriers to adherence of antiretroviral therapy are associated with decreased adherence over time." <i>AIDS and Behavior</i>, 19(1), 85-92.</p>	<p>To gain understanding about how different types of barriers to adherence to antiretroviral therapy (ART) are related</p>	<p>Quantitative study</p>	<p>Randomized control trial of intervention + statistical analysis</p> <p>Barriers assessed: medication and health concerns, stigma, family responsibilities, problems with schedule/routine</p>	<p>N=151</p>	<ol style="list-style-type: none"> 1. Average adherence was 73% 2. At least 1 barrier to adherence was reported in 70% of visits reported in the study, while 2 or more barriers were reported in 40% of the visits 3. Perceived stigma was reported during 17% of study's visits 4. Labeling adherence as "intentional" simplified patient's psychosocial processes 5. Barriers related to concerns about medications and health had a larger overall impact on adherence 6. Higher number of depressive symptoms were associated with statistically significant decreases in objectively measured adherence
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Ho and Holloway (2015)	To examine how HIV- related stigma affects lives of people living with HIV/AIDS	Qualitative study	Systematic review	N/A	<p>1. Stigma can cause psychological distress in HIV-positive women because of discrimination they have faced or worry over disclosing their status</p> <p>2. Stigma heightens rejection and may increase risky behaviors</p> <p>3. African-American women appear to experience more adverse psychological distress as a result of HIV-related discrimination compared to Caucasian women</p> <p>4. The cumulative effects of HIV-related stigma and pre-existing prejudices in relation to gender and race could collectively increase female psychological burden</p> <p>5. The underlying mechanism between HIV-related stigma and female psychological well-being remains unclear and is needed for future exploration</p> <p>6. The overuse of universal precautions impedes healthcare provider trust</p>
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Johnson et al. (2009)	To identify group differences in self-reported reasons for not taking ART among a diverse sample of HIV-infected men and women	Qualitative study	Cross sectional interviews	N=3181	<p>1. 53% of African-American participants reported stopping ART</p> <p>2. Majority of women stopped using ART</p> <p>3. African-Americans were more likely to stop ART due to changes in healthcare providers or clinics</p> <p>4. African-Americans were more likely to endorse wanting to hide their HIV status as a reason for discontinuing ART</p> <p>5. Among those respondents who had never taken ART, there was an increased likelihood for African-Americans to report that they were waiting for their viral markers (CD4 and viral load) to worsen</p> <p>6. Women were more likely than men to have previously stopped ART</p>
Katz et al. (2013)	To explore the relationship between HIV-related stigma and ART adherence	Qualitative studies	Systematic review	N/A	<p>1. HIV can compromise relationships via social isolation</p> <p>2. Medication can give rise to physical stigma (i.e. blindness, skin rashes, herpes zoster)</p> <p>3. Adherence is economic burden on single women</p> <p>4. Stigma compromises general psychological processes like adapting, coping, and social support</p> <p>5. Adaptive coping is a critical factor for adherence</p>

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<p>Konkle-Parker, Erlen, and Dubbert (2008)</p> <p>Barriers and facilitators to medication adherence in a southern minority population with HIV disease. <i>Journal of the Association of Nurses in Aids Care</i>, 19 (2), 98-104.</p>	<p>To identify perceived barriers and facilitators for HIV medication adherence in a primarily African American, low income sample to support the development of an adherence intervention</p>	<p>Qualitative study</p>	<p>Group interviews</p>	<p>N=20</p>	<ol style="list-style-type: none"> 1. Patient related barriers included burden of extra planning and remembering throughout the day, denial of disease status, life stress, side effects of medications (nausea, diarrhea, fatigue), and shame 2. Facilitators of adherence included acceptance of diagnosis, thinking about consequences of not taking medications, prayer/spirituality, improvements of medications, trusting relationship with healthcare provider, and support from family and friends 3. Stigma often results in loss of relationships and social rejection 4. Personal ridicule led participants to feel need to hide diagnosis 5. Shame associated with picking up medication and taking it at work 6. Educating support system about diagnosis facilitated adherence
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Peltzer, Domian, and Teel (2015)	To explore lived experiences of young African-American women living with HIV	Qualitative study	Patient interviews	N=11	<ol style="list-style-type: none"> 1. Social support facilitated self-care 2. Participants did not feel normal living with HIV and tried to suppress acknowledgement of the disease 3. Stigma and discrimination from healthcare professionals reduced self-worth and makes them feel dehumanized, humiliated, and isolated 4. Feelings of depression and suicidal thoughts upon diagnosis were common and impeded healthy lifestyle 5. Women taking ART were particularly resistant to taking medications, as antidepressants would be another medication to add to their complicated drug regimens 6. Lack of transportation prevented support group engagement 7,. African-American women often remain silent about depression, seeing it as a personal weakness, and many go undiagnosed with depression 8. Women in the study worried about being admitted inpatient for depression and wouldn't be able to care for kids 9. Hiding disease status while feeling depressed further isolated participants 10. Financial burden of self-care posed as a barrier
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Sweeney, and Venable (2016)	To synthesize findings regarding associations between stigma and adherence and discuss mechanisms of the stigma and adherence relationship	Quantitative study	Systematic review	N/A	<p>1. Possible links of stigma to medication adherence involve vulnerability to mental health difficulties (i.e. depression), reduction in self-efficacy, and disclosure of disease status</p> <p>2. Internalized stigma may enhance vulnerability to mental health difficulties, such as depression, which impede adherence</p> <p>3. High levels of stigma may reduce self-efficacy of taking medications, which may impede adherence</p> <p>4. Stigma may cause depression, which can lead to inconsistent medication adherence</p>
Tufts (2015)	To evaluate mHealth self-management interventions that have been developed for African American HIV-positive women	Qualitative study	Systematic review	-	<p>1. Most evidence-based HIV behavioral interventions don't holistically address self-management (i.e. frequency of clinic visits, diet, exercise, self-monitoring habits)</p> <p>2. African-American women account for higher proportion of HIV infections at all stages of the disease (44% of those living with HIV, 45% of newly infected per year, incidence rate is 20 times higher than Caucasian women and 5 times higher than Hispanic)</p> <p>3. No mHealth HIV self-management studies conducted in the United States were specifically customized for use by HIV-infected African-American women</p>

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